Development and Successful Pilot of a Web-based Scaleable, Distributed Curriculum Development and Management System for Medical Education

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Abstract: In response to a need for a comprehensive online curriculum development and management system for medical education at the University of Pittsburgh the author, the Lab for Educational Technology (the Lab), students and faculty developed the Pitt Med Navigator website (Navigator). This completely web-based, distributed, personalized application is used by students and faculty to: 1) create, manage, and rapidly access online course resources; 2) author teaching cases, interactive multimedia presentations, and quizzes; and 3) manage a personal education portal. Four pilot courses and objective evaluations have revealed high student and faculty utilization and a high degree of perceived educational value.

Background: Internet communication is an integral part of medical education and, while not shown to be inherently superior to other modalities, it is well accepted as part of the modern teaching armamentarium. However, management of online resources and creation of original content by faculty has been limited to commercial applications designed for college curriculums or reliance on web-development IT staff. Off-the-shelf curriculum management programs lack certain features: 1) rapid access to curricular resources; 2) decentralized administration of editing responsibility by multiple faculty within a single course; 3) interactive case authoring; 4) an open highly-scaleable database design; 5) searching across and within courses; and 6) the ability to finely control editing and viewing of content. The students, faculty and the Lab decided to design, create, and validate its own curriculum development and management website to meet these needs in a scaleable application easy enough for the average faculty member to use.

Methods: A group consisting of two medical students, three faculty, the Lab's director and a programmer designed, developed and piloted the Pitt Med Navigator system between January 2002 and March 2003. Weekly design meetings, rapid prototyping and frequent testing were used to create the site over the course of eight months. Enterprise-grade database, web server and scripting technologies included SQL Server 2000, Internet Information Server and Active Server Pages (all Microsoft, Redmond, WA), respectively. Formative evaluations included student focus groups and faculty interviews. Final validation was through student surveys and analysis of server logs using WebTrends Enterprise Suite (version 5.5, WebTrends, Portland, OR).

Results: Three functions encompass the core of the resulting application. ***Access*** gives users, based on a self-managed education profile, direct calendar-based access to online resources, ***Browse*** lists all online content by title, module type, and curriculum, and ***Create***, which has tools for authoring four types of learning modules – courses, teaching cases, multimedia collections and quizzes. Each tool enables faculty to independently create and use modules together and within each other. Authors can assign editing privileges to other faculty and control viewing access for all or part of a module. Other features include self-administration of accounts and preferences, and a personal portal to bookmarks, links, online references, and searching.

Navigator was successfully piloted in four second-year courses: nephrology, gastroenterology dermatology and neuroscience between September 2002 and March 2003. The faculty from these courses created 324 learning modules consisting of 4467 web pages and 2846 uploaded documents. Analysis of server logs showed high use in these courses correlating with typical study patterns. A single four week course with 150 students logged 6,567 unique visits averaging 39 minutes in length, with just under a half a million individual page-views

Second-year medical students (106) completed an 11 question survey. When asked if Navigator added significantly to the learning experience 40% answered "to a very high degree", 21% "to a considerable degree" and 14% "to a moderate degree." Eleven percent and 8% felt it added to a "small degree" and "not at all," respectively.

Discussion: This application has met its intended content development and management goals and achieved a high level of use and acceptance by students and faculty. Expanded use locally and across multiple institutions is underway with the intent of improving world-wide access to medical education. The Pitt Med Navigator is available for viewing at **http://navigator.medschool.pitt.edu**. Some portions of this application were demonstrated at the March 2003 IMIA Education Working Group meeting.